

Effect of Smart Technology on Students' Academic Achievement at Secondary Level: An Experimental Study

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Abstract

The study was carried out to find out the effect of smart technology (Mobile Phone) on academic achievement of students at secondary level General Science in district Bagh AJ&K, Pakistan. To achieve objectives of the study the researchers conducted an experimental research. Two groups Experimental and Control were formed by generating random numbers from grade 9th students. Each group was consisted of 10 students. The experimental group was taught by the researcher using smart technology (Mobile Phone), while the students of control group were taught traditionally. The post tests were constructed on the basis first three levels (knowledge, comprehension and application) of Bloom taxonomy. At the end of every lesson a post test was given to the students of both the groups. Post tests were taken to assess the achievement of the students. Ten posttests were given to both groups of students and then tests were checked by researchers. Mean values of ten tests were calculated overall and three levels of cognitive domain. Data were recorded and then t-test independent sample was applied for the comparison of Mean values of the both groups. Findings of this research show variation relating two groups. Experimental group showed better performance as compared to the control group. It is concluded that smart technology is very effective technique for teaching-learning process of general science in schools. Smart Technology (use of Mobile Phone) is recommended for teaching-learning process at secondary school level.

Key Words: Smart Technology, Mobile Phone, Academic achievement,

Introduction

No doubt smart technology has changed our lifestyle today. It has impacted and reclassified living in different parts of life. Undoubtedly, Technology in any field of presence assumes a significant job. It is conceivable to mechanize different manual tasks. With the help of current technology,

numerous complicated and imperative phases can be performed easily and more noteworthy execution. Our lives have been changed by the utilization of technology. The region of schooling has been altered by technology. It has become simpler for educators to confer data and for learners to learn it with the beginning of personal computers in schooling. The utilization of technology has made the instructing and learning measure all the additionally revitalizing (Sung, Chang, & Liu, 2016).

According to Pew Research Center (2018) the 77 percent of Americans in 2018 possessed a smart phone, which is a mobile device that can perform numerous computer-like tasks (Alosaimi, Alyahya, Alshahwan, Al Mahyijari, & Shaik, 2016). Additionally, a 2015 survey revealed that 46% of Americans said they couldn't live without their smart phone (Smith, 2015). Similar figures have been seen in other (Western) regions of the world (OECD, 2017).

Thus, it shouldn't be a surprise that questions about the (possible) effects of (heavy) smart phone use have taken centre stage in public discourse (Eliahu, 2014; OECD, 2017). Smart phone use is anticipated to interfere with people's educational and professional lives in addition to its (possible) effects on their personal lives. It has been specifically connected to the academic success of secondary students. According to Pew Research Center (2018) smart phone ownership is highest among those between the ages of 18 and 29, a demographic that includes many students. Furthermore, there are numerous theoretical justifications for expecting a direct impact of (heavy) smart phone use on academic achievement. The effect of use of smart phone is widespread on secondary academic achievement. A smart phone ban was implemented in French schools in 2017; (Samuel, 2017). Second, while interventions have been developed in a number of nations to discourage heavy smart phone use in class because it is thought to hinder knowledge acquisition, it is unclear whether these widely held perceptions align with a consensus in the relevant scientific literature.

On the one hand, certain features of smart phones may, with right application, consequently improves the academic performance. Students can greatly benefitted the use of portable smart phone that further improves the productivity and strengthening students' performance (Lepp, Barkley, & Karpinski, 2014). Students have the opportunity to continuously search for information linked to their studies thanks to the capabilities' simple accessibility. Consequently, using a textbook cannot replace the multi-media platform offered by smart phones to enhance learning (Zhang, Ho, & Ho, 2014). Moreover, the speedy dissemination of pertinent information is carried out via websites that facilitates social networking. Consequently inline with the similar approach followed can be more productive as a result of students and teachers communication (Chen & Ji, 2015; Lepp, Barkley, & Karpinski, 2015).

Nonetheless, data suggests that university students use their smart phones more as a source of amusement than as a tool for work (Lepp, Barkley, Sanders, Rebold, & Gates, 2013). These results are consistent with a time trade-off between smart phone use and study-related activities. In other words, the time spent using a smart phone is time that could be spent studying. Using smart phone a student at a secondary level could be detrimental to their academic success during teaching learning process.

It is frequently realized that the 21st century is a period of technology. It has a huge influence on our lives. It is viewed as the establishment of an economy's development. In the present situation, an economy that is innovatively frail will never create. This is on the grounds that Technology makes things a lot less complex and less tedious for our positions. In any conceivable field, one such field is schooling (Sung, et al., 2016). The impact of technology can be felt. PC/workstations, phones, Internet, and LCD projectors are utilized in the field of education in Azad Jammu and Kashmir as an innovative technology.

Considering the significance of understanding technology as an apparatus, particularly with regards to schooling, a few highlights and convictions about Technology will be outlined in the associated conversation. The idea of staying aware of the occasions is related to the utilization of technology and professes to be in accordance with a continually advancing society and the worldwide atmosphere. The most generally acknowledged avocation is growing access, expanding adaptability, and cost-adequacy among the different reasons and reasons why colleges draw in with e-learning or web-based learning (Söderström and Horne, 2013).

So as to start and broaden separation, on the web and mixed learning, mechanical headway is accordingly characterized as the main component, where the educational phase is chiefly encouraged by educational development. Technology isn't thinking back however guarantees a superior future, and with Technology, anything we need to improve (Verene, 2013). The researchers attempted to research the effect of the classroom utilization of PCs. The study additionally took a quick look at investigating the facilitators and impediments in the home room for educators utilizing computers (Garthwait and Weller, 2005).

The study demonstrated that learners were more ready to consider legitimate mistakes and make the fitting adjustments on their PCs. Teachers ended up doing short and straightforward presentations so learners could begin utilizing their PCs rapidly to finish the dynamic learning errands (Gathwait & Weller, 2005). This study gives proof that, because of the presence of the PC, learners are all the more ready to learn. Motivation is the key to expanding learning limits and empowering scholastic accomplishment for learners.

The cell phone is utilized in virtual networks and organizations as a method for cooperation between individuals in which information and thoughts are made, mutual, and traded (Blumenstock and Eagle, 2010). It likewise utilizes a gathering of electronic applications that expand on Web 2.0's philosophical and specialized establishments that empower client created substance to be delivered and shared (Mayer and Mereno, 2003). Besides, the wireless is utilized to store different substances on the interior memory of the miniature SD cards or telephones (Meek, 2006).

Admittance to the Internet has presented numerous young people to different sorts of substances. Recently, the accessibility of different sorts of modest and reasonable Android PDAs has made it simple for adolescents to get to different types of web-based media and erotic entertainment destinations where they can get to, download, offer and watch explicit movies from everywhere in the world. So as to encourage learning, specialized headways (from a pencil to pen and pen to chalk and a slate to a screen and a Liquid Crystal Display (LCD) projector) have frequently been presented in the study hall (Bhatt, 2008). LCD assumes a significant function intending to the

necessities of learners with changing learning styles and drawing in learners during the learning stage with the different sorts of technology at present accessible for use (Sedler, 2009).

A supportive technology device is any segment, bit of hardware, or item framework that is utilized to improve, protect, or upgrade the useful gift of learners (Beard, Riley, and Strain, 2004). Smart technology isn't just a gadget to make a study hall wake up, yet can likewise come as "Smart Technology." Now it's good to think again concept of including smart technology in process of curriculum development and pedagogy, for learning process, with technology. This ensures the use of technology turn out to be crucial for learning environment and its essential teaching and learning process for consideration. In designing learning environments for students, an instructor has several concerns and influences, and the proper use of technology is just one of those concerns. Teachers stay up-to-date with curriculum developments, new educational policies and advancements in teaching practice in the arts and sciences; they stay up-to-date with the technical instruments available to them. Researchers studied the use of smart technology in Pakistan, but unfortunately no study has been found in AJK, taking into account that the researcher plans to conduct this research in the district of Bagh to see effect on secondary students' academic achievement with smart technologies. The study is significant for the teachers as it will help teachers to become aware of the effectiveness of smart technology at secondary level. It will also help students to use smart technologies in their studies to enhance their learning. The present study is hoped to be helpful for the authorities to design the syllabus according to the need of time.

Any component, piece of hardware, or item framework used to enhance, safeguard, or update the helpful gift of learners is referred to as a supportive technology device (Beard, Riley, and Strain, 2004). Smart technology can refer to a variety of things, not merely a device to wake up a study hall. Given that smart technology was already a part of our daily lives, it is time to rethink the idea of incorporating it into the curriculum and pedagogy to aid in the learning process. This makes sure the technology was integrated into the learning environment and is taken into account during process of teaching-learning. Proper use of technology is just one of the considerations that instructors have while creating learning environments for their students. Teachers keep up with new changes in curricula, educational policies, and teaching methods in the arts and sciences. They also stay updated with the technological resources at their disposal. Since the researcher intends to conduct this research in the district of Bagh to examine the effect of smart technologies on secondary school students' academic achievement, because no study on the usage of smart technology in AJK have been conducted. The study is important for the instructors since it will assist them understand how smart technology works at the secondary level. Students will benefit from using smart technologies in their coursework to improve their learning. The current study is intended to assist the authorities in developing the curriculum in accordance with the demands of the period.

Smart Technology

A fundamental definition of smart technology is something that goes beyond the usual sending and receiving, information search by consumer, and traditional turning on and off of devices. Instead, it uses the Internet to provide the customer considerably more interaction and control.

Mobile Phone

A mobile phone is a compact, portable radio telephone, sometimes referred to as a hand phone, cell phone, or cellular telephone. A brand-new class of mobile phone known as a "smart phone" has gained popularity in the twenty-first century.

Objectives of study

1. To measure the academic achievement of Control Group 9th grade students' in general science
2. To measure the effect of Smart Phones on academic achievement of Experimental Group 9th grade students' in general science
3. To compare the students' academic achievement of control and experimental groups in General Science 9th grade.

Research Hypotheses

H₀.1 No significant difference found between academic achievement of control and experimental group.

Research Methodology

This research was an experimental nature. In experimental research, findings are tested against the hypothesis. It outlines the strategies for gathering and examining relevant knowledge and data during the research. This study design is posttest control group. Researcher controls independent variable by treatment in a true experimental design. According to Best True Experiment, equality refers to the random assignment of subjects to experimental and control groups. It is the most genuine kind of research.

Sample

The 9th Class students enrolled in the girls Inter College Harighal in District Bagh Pakistan was sample of this study. All the 20 students studying in class 9th were selected as sample for present study and further divided into two groups and consisted of 10 students in Control group and 10 in experimental by generating random numbers. In this way two groups consisted of equal achievement level.

Research Tool

In order to collect data ten posttests were constructed on the basis of Blooms' Taxonomy from 9th grade text Book of general science developed by Text Book Board Azad Kashmir. The post tests were constructed on the basis first three levels of Blooms' Taxonomy (knowledge, comprehension and application). Objective type written question papers were developed. Each test was consisted of fifteen multiple choice questions and ten short answer type questions. The MCQs were constructed on the basis of first three levels of Bloom taxonomy, five items are of each level i.e., Knowledge, comprehension and application. Similarly short answer question are also developed on three levels, four items are of knowledge level, three each of comprehension and application levels.

Procedure for Collection and Analysis of data

This research was conducted in Girls Inter College Harighel Bagh, Pakistan and the class taken for the experiment was 9th grade in the subject of General Science. Experiment was conducted on two groups experimental and control. The ten topics were selected from textbook and taught to experimental group by using smart phones and control group with traditional method (lecture method). At the end of each day both groups were given posttest for data collection. After ten days the researchers marked the achievement tests separately on each level.

Data analysis is clearly the most important step in research. This is because researcher admires the facts about the responses in questions. Data were analyzed by applying t-test independent sample with the help of SPSS-24 software.

Results

Table: 1. Test of Normality

| Dependant Variables | Groups | Shapiro-Wilk | | |
|------------------------------------|--------------------|--------------|----|------|
| | | Statistic | df | Sig. |
| Overall Achievement | Experimental Group | .950 | 10 | .663 |
| | Control Group | .982 | 10 | .976 |
| Achievement at Knowledge-Level | Experimental Group | .932 | 10 | .472 |
| | Control Group | .901 | 10 | .224 |
| Achievement at Comprehension-Level | Experimental Group | .928 | 10 | .433 |
| | Control Group | .830 | 10 | .033 |
| Achievement at Application-Level | Experimental Group | .969 | 10 | .881 |
| | Control Group | .939 | 10 | .540 |

Table-1 shows that the significance value calculated in Shapiro-Wilk test for all data is greater than standard value .05 except control group at comprehension level. Hence, data was normally distributed and independent sample t-test could be used.

Table 2: Overall Mean of Achievement test score

| | Groups | N | M | SD | T | df | (p value) |
|--------------------------|--------------------|----|-------|------|--------|----|-----------|
| Overall achievement test | Experimental Group | 10 | 41.47 | .65 | 36.790 | 18 | .000 |
| | Control Group | 10 | 26.79 | 1.08 | | | |

Table-2 shows that mean for experimental group (M= 41.47, SD= 0.65) was larger than mean of control group (M=26.79, SD = 1.08) and $t(18) = 36.790$, $P < .05$ indicated that significant difference is observed between mean of experimental group and control group regarding overall students' achievement test. Result is concluded that the use of smart technology for delivering lesson has significant effect on achievement.

Table 3: Mean of Achievement test at Knowledge level score

| | Groups | N | M | SD | T | df | (p-value) |
|----------------------------|--------------|----|-------|------|-------|----|-----------|
| Knowledge Level test score | Experimental | 10 | 15.38 | .915 | 9.560 | 18 | .000 |
| | Control | 10 | 11.24 | 1.02 | | | |

Table-3 shows that mean for experimental grouping (M= 15.38, SD = 0.915) is larger and Group taught with traditional method have less mean value (Mean =11.24, Std = 1.02) with $df=18$ $t = 9.560$, $P=.000$ point out that considerable dissimilarity is observed among mean of experimental group and control group regarding questions of knowledge level in achievement test. It is concluded that the use of smart technology for delivering lesson has significant effect on achievement.

Table 4: Mean of Achievement test at Comprehension Level score

| | Groups | N | M | SD | T | df | (p value) |
|--------------------------------|--------------|----|-------|------|--------|----|-----------|
| Comprehension Level test score | Experimental | 10 | 13.47 | .389 | 25.620 | 18 | .000 |
| | Control | 10 | 7.43 | .636 | | | |

Table-4 shows that mean for experimental grouping (M= 13.47, SD = 0.389) is greater and Group taught with traditional method have less mean value (Mean = 7.43, Std = 0.636) and $df= 18$, $t = 25.620$, $P=.000$ pointed out that considerable dissimilarity is present among mean of experimental group and control group regarding questions of comprehension level score in achievement test. It is concluded that the use of smart technology for delivering lesson has significant effect on achievement.

Table 5: Mean of Achievement test at Application Level

| | Group | N. | Mean | Std | t | Df. | (p- value) |
|--|-------|----|------|-----|---|-----|------------|
|--|-------|----|------|-----|---|-----|------------|

| | | | | | | | |
|-------------------|-------------------------|-----|-------|------|--------|----|------|
| Application Level | Group1- Experimental | 10 | 12.62 | .834 | 14.879 | 18 | .000 |
| | Group-2 Control | 10. | 8.12 | .468 | | | |

Table-5 shows the mean for group-1 taught with smart Phone (experimental) (Mean = 12.62, Std = 0.834) is higher and the Value of control grouping (Mean= 8.12, Std = 0.468) with $df=18$, $t = 14.879$, $P=.000$ also showed that significant difference is pointed out between mean of experimental group and control group regarding questions of application level score in achievement test. It is concluded that the use of smart technology for delivering lesson has significant effect on achievement.

Discussion

It is agreed that teachers and students observed that smart technology is an important tool for enhancing the achievement of secondary level students. This encourages students to consider science in a better way. It is seen from the big differences in posttest rating. Such kinds of events are of interest to students. Again and again, they decided to watch educational videos on mobile phones because these videos reduce their boredom and make them active participants. The results of the current study and the recorded studies in the literature review are similar in certain respects. All the advantages of smart technology recognized in the literature review implemented in the current study by applicants. Research in the literature review for the thesis showed that the use of smart technology-enriched learners' time spent on tasks in different ways. In this study in all sessions, as smart technology is implemented, students do not wait for teacher education (Thornton and Houser, 2004).

The present study showed that the use of smart technologies resulted in good achievement. It was also discovered that this method of teaching had an effect on students' success. According to the data acquired, the control group obtained a lower score in the achievement test compared to the experimental group in the achievement test. It showed that in the General Science class aftercare (using smart technology), the experimental group enjoyed higher levels of achievement linked to successful knowledge and accomplishment. The use of smart technology was found to have positive effects the process of teaching in the high schools, and a difference was found between two groups who were taught with smart phone and traditionally. The results are in line with Brown's (2003) research that the use of smart technology in general science classes has many advantages. This is according to a study that the students would need to watch, though awareness is insufficient.

Conclusions

The research showed positive effects of smart mobile phone at secondary school level general science. Because of consistent innovative enhancements, such kinds of study concentrates in the field of schooling should be directed. The utilization of brilliant Technology is a down to earth gadget that has a positive and huge effect on the learning cycle of students.

This study has demonstrated that the utilization of shrewd Technology in science instructing have positive effects on the whole process of learning. It advances the open methodology of educating, utilizes real material, and presents various students' encounters. It furnishes learners with a learning climate through smart technology and improves their insight at the secondary level, other than broad science course books. Presently a day's classrooms with new technology that are entrenched are slowly getting normal for instructing science subjects at school level education.

The researchers came to know in the flow research study that learners at the optional level are energetic about the subject of general science utilizing smart technology. They are serene and fulfilled. Shrewd advances were a totally new system for them from the start, yet they were increasingly keener on learning, so sooner or later, they became dynamic members in this field. They delighted in all the exercises in the homeroom completed by the specialist. Although every one of the three levels of the Bloom taxonomy (knowledge, understanding, application), it was noticed a significant outcomes from their general science post-tests.

Present research demonstrated that accomplishment of group taught through smart phone is fantastic contrasted with group taught through traditional method that showed clearly positive picture is critical and found that deployment of smart technology in secondary schools during instructing at locale of Kashmir. Smart technology has had positive and huge by and large effects for educational purposes in the study hall.

Recommendations

Having concluded the study, the investigators suggested the following:

1. It is recommended that the AJ&K government may provide the technical facilities like smart phones at secondary level school level for teaching of general science.
2. Kashmir Text Book Board may also include the use of smart technology in each and every chapter included in the general Science Text Book.
3. It is recommended that Curriculum developers should include the use smart equipment in curriculum as a teaching aid in teaching of general science
4. The school education department of district Bagh ought to ensure utilization of smart technology as teaching aid.

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